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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/714,855	11/18/2003	Motohisa Kamijo	50943-022	3726

7590 06/01/2006

McDERMOTT, WILL & EMERY
600 13th Street, N.W.
Washington, DC 20005-3096

EXAMINER	
HANDAL, KAITY V	

ART UNIT	PAPER NUMBER
1764	

DATE MAILED: 06/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/714,855	KAMIJO, MOTOHISA	
	Examiner	Art Unit	
	Kaity Handal	1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) _____ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-17 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 11/18/2003.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 14 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With respect to claim 14, the limitation to estimate a predetermined amount of soot on the filter is confused as how can something already predetermined need to be estimated?

Specification

Page 8, lines 29-30 are missing the respective figure reference numbers as filter (200) is in figure 2 and reformer (120) is in figure 1.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-3, 9-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seaba et al. (US 2004/0079031 A1) in view of Kupe et al. (US 2004/0098977 A1).

With respect to claims 1 and 10, Seaba teaches a fuel reforming system/apparatus and method (fig. 1) for reforming a hydrocarbon fuel characterized by: a first vaporization zone (22) for receiving a hydrocarbon fuel and combining it with air (as illustrated); and a reformer (34) in fluid connection with and down stream of the first vaporization zone (22) which receives the hydrocarbon fuel combined with air to reform the fuel to a reformate stream (illustrated), which contains a hydrogen rich atmosphere (page 2, paragraph [0025]); a second vaporization zone/heat exchanger (38) (which operates at vaporization temperature of 450°C – (page 2, paragraph [0026], lines 1-3) in fluid connection with the reformer (34) which is capable of receiving the reformate stream from the reformer (34) (as illustrated); and a water inlet (illustrated) connected to the second vaporization zone (38) capable of introducing water to the reformate stream.

Seaba fails to show a filter in fluid connection with and down stream of the second vaporization zone (38) which is capable of preventing a substantial portion of any soot contained in the reformate stream from passing therethrough, and wherein the system is adapted to oxidize any soot collected on the filter in the hydrogen atmosphere of the reformate stream. Kupe teaches an apparatus for regenerating a particulates filter (fig. 1) comprising a reformer (fig. 1, 16) and a soot/particulates filter (36) (page 1, paragraph [0006]) downstream of a vaporization zone/heat exchanger (page 4, paragraph [0043], lines 7-12), and wherein said filter (36) is

capable of preventing a substantial portion of any soot contained in the reformate stream from passing therethrough in order to trap soot and prevent it from exiting the tailpipe (page 1, paragraph [0006], lines 1-5).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include a soot filter down stream the second vaporization zone of Seaba's apparatus, as taught by Kupe, in order to trap soot and prevent it from exiting the tailpipe.

Seaba as modified does not explicitly teach a set period of time within which water is added during the reforming to oxidize the soot collected on the filter. Seaba however does teach adding water to the reformate stream as it passes through the second vaporization zone (38) until the predetermined operating temperature is reached (page 2, paragraph [0026], lines 6-8).

With respect to claims 2 and 11-12, Seaba as modified teaches wherein said system is adapted to introduce water to the second vaporization zone (38) in excess in order to reach the desired syn-gas stream temperature. The same water inlet to said second vaporization zone (38) can be adapted to introduce air as well in order to further cool the syn-gas (page 2, paragraph [0026], lines 1-3).

With respect to claims 3 and 13, Seaba as modified teaches wherein said system has an oxidizing catalyst/water-gas-shift (42) downstream of the filter to reduce the amount of any oxygen/carbon monoxide in the reformate stream (page 2, paragraph [0026], lines 1-6).

With respect to claim 9, Seaba as modified teaches a water gas shift (WGS) reactor (50) down stream of the filter of Kupe, a heat exchanger (54) down stream of the WSG (50), and a preferential catalyst (60) down stream of the heat exchanger (54).

5. Claims 4-8 and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seaba et al. (US 2004/0079031 A1) in view of Kupe et al. (US 2004/0098977 A1), as applied to claims 1 and 10 above, and further in view of Smaling (US 2003/0200742 A1).

With respect to claims 4-5 and 15, Seaba discloses all claim limitations as set forth above but fails to show wherein the system is being adapted to detect soot accumulated onto the filter and wherein soot is detected on to the filter by a differential pressure gauge connected to the system for measuring the pressure of the reformate stream before and after the filter. Smaling teaches an apparatus and method (fig. 2) for regenerating a particulate filter (76) wherein soot accumulated onto the filter (76) is detected by a differential pressure gauge connected to the system for measuring the pressure of the reformate stream before and after the filter in order to determine if the buildup of soot in the soot particulate filter has reaches a predetermined level (page 5, paragraph [0045], lines 8-11).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to detect soot accumulated onto the filter by a differential pressure gauge connected to the system for measuring the pressure of the

reformate stream before and after the filter in Seaba's modified apparatus, as taught by Smaling, in order to determine if the buildup of soot in the soot particulate filter has reaches a predetermined level.

With respect to claim 6, Smaling further teaches wherein detecting soot on the filter is by determining the operational history of the reformer (page 4, paragraph [0040]).

With respect to claim 7, Seaba as modified teaches introducing water to the reformate stream down stream of the filter (to heat exchanger (46)) when the temperature of the reformate stream reaches a predetermined value (page 2, paragraph [0026], lines 6-8).

With respect to claims 8 and 16, Seaba discloses all claim limitations as set forth above but fails to show explicitly wherein the filter temperature outlet is estimated by a temperature sensor connected to the system to detect the temperature of the reformate stream in the third vaporization zone (after the soot filter and before the water gas shift reactor (136) of the instant application). However Seaba does teach having an operational temperature range for the heat exchanger (fig. 1, 46) and thereby it would be natural to have a temperature measurement device to measure the temperature at that point and confirm the operational temperature as desired (page 2, paragraph [0026], lines 6-8).

With respect to claim 17, Seaba as modified teaches introducing water to the reformate stream down stream of the filter (to heat exchanger (46)) when the

temperature of the reformate stream reaches a predetermined value (page 2, paragraph [0026], lines 6-8).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kaity Handal whose telephone number is (571) 272-8520. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KH

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5/25/2006

Glenn Caldarola
Supervisory Patent Examiner
Technology Center 1700